Name: Alicia Dearing

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Assignment 07

https://github.com/adearing27/DBFoundations-Module07

SQL Functions

# Introduction

SQL functions are used to either return simple values or complete complex calculations or changes to data. Many functions have already been created that can be used in SQL server programs that can assist with simple modifications like changing dates and labeling numbers as money. There are more complex functions that can assist with functions as needed for business logic or data analysis. User-defined functions can also be created when more customized calculations or logic needs to be returned from a SQL query. Functions can generally return scalar, inline table-valued, and multi-statement table-values depending on the query.

## When A SQL User-Defined Function Would be Used

SQL User-Defined Functions (UDF) create custom logic or queries to simplify code and be easily reusable within a database. UDFs can help when a calculation may be used several times or repeated across multiple queries. They reduce the need to reproduce complex queries and maintain internal logic within the database. In this way, the UDF also simplifies complex queries by allowing just the coding for the UDF rather than the entire logic inside the UDF. Aside from streamlining the coding, it also helps to simplify and standardize logic across a database where the UDF’s calculations apply. Creating UDFs also allows customized calculations when standard SQL functions don’t fit what’s needed. UDFs help balance code reuse, readability, and database operation performance.

## The Differences Between Scalar, Inline Table-Valued and Multi-Statement Table-Valued Functions

SQL User-Defined Functions can return three types of values: scalar, inline table value, and multi-statement value. Scalar values return a single value for each input, such as an integer, character, or datetime value. Inline Table-Valued Functions (iTVFs) return a table as the result of their query. They function as a view with parameters and are helpful when applying select statements. They are more efficient than multi-statement functions because they are expanded in line at execution. Multi-Statement Table-Valued Functions (mTVFs) return a table but have more complex logic with multiple statements like temporary tables and loops in the function's body. mTVFs are used for more sophisticated transformations and calculations that require some middle step to reach the desired result. They are slower to execute because they have more complex logic and coding.

# Summary

Functions are useful for transforming raw data into more usable single-data results with scalar functions. They can also be used to complete more complex calculations and transformations with iTVFs and mTVFs. Many functions have already been programmed into SQL server software, but users can also create UDFs when specific functions are used repeatedly. UDFs simplify coding by keeping complex logic within the programmed function, which can be repeated without having to retype the statement every time. UDFs simplify the coding and allow for more consistent internal logic.